WHAT IS CLAIMED IS:

1. A computer-implemented method for generating a computer model of one or more teeth, comprising:

receiving as input a digital data set of meshes representing the teeth;

selecting a curved coordinate system with mappings to and from a 3D space; and

generating a function in the curved coordinate system to represent each tooth.

2. The method of claim 1, further comprising displaying the computer model of the teeth using the function and the coordinate system.

3. The method of claim 1, further comprising storing a compact coordinate system description and the function in a file representing a compressed version of the digital data set.

4. The method of claim 3, further comprising transmitting the file to a remote computer.

5. The method of claim 4, further comprising displaying the computer model of the teeth using the function at the remote computer.

6. The method of claim 4, wherein the file is transmitted over a network.

7. The method of claim 6, wherein the network is a wide area network.

8. The method of claim 6, wherein the network is the Internet.

9. The method of claim 1, wherein the coordinate system is based on the following equation:

$V = P(\varphi, \theta) + R * \text{Direction}(\varphi, \theta)$

where V is the corresponding point in three-dimensional (3D) space to (φ, θ, r), P and Direction are a vector functions expressed in terms of φ and θ.

10. The method of claim 9, wherein the P and Direction functions are selected to minimize the deviation between the tooth model and a parametric surface specified by the curved coordinate system and the function.

11. The method of claim 9, wherein P and Direction are different for incisors and molars.

12. The method of claim 1, further comprising determining a radius value.

13. The method of claim 1, further comprising receiving an instruction from a human user to modify the graphical representation of the teeth and modifying the graphical representation in response to the instruction.

14. The method of claim 13, further comprising modifying the selected data set in response to the instruction from the user.

15. The method of claim 13, further comprising allowing a human user to select a tooth in the graphical representation and, in response, displaying information about the tooth.

16. The method of claim 13, wherein rendering the graphical representation comprises rendering the teeth at a selected one of multiple viewing orthodontic-specific viewing angles.

17. The method of claim 13, further comprising providing a user interface through which a human user can provide text-based comments after viewing the graphical representation of the teeth.

18. The method of claim 13, wherein rendering the graphical representation comprises downloading data to a remote computer at which a human view wishes to view the graphical representation.

19. The method of claim 1, further comprising delivering data representing the positions of the teeth at selected points along the treatment paths to an appliance fabrication system for use in fabricating at least one orthodontic appliance structured to move the teeth toward the final positions.

20. The method of claim 1, further comprising detecting teeth collision using the curved coordinate system.

21. A computer-implemented method for communicating information on one or more teeth, comprising:

providing a digital tooth model;

compressing the digital tooth model; and

communicating the digital tooth model over a network.

22. The method of claim 21, wherein the compressing the digital model further comprises:

selecting a curved coordinate system with mappings to and from a 3D space; and

generating a function in the curved coordinate system to represent each tooth.

23. The method of claim 21, wherein the compressing the digital model generates a file that is less than five kilobytes in size.

24. The method of claim 21, wherein the compressing the digital model generates a file that is between five kilobytes and one hundred kilobytes in size.

25. The method of claim 21, wherein the compressing the digital model generates a file that is between one hundred and five hundred kilobytes in size.

26. The method of claim 21, wherein the compressing the digital model generates a file that is between five hundred kilobytes and one megabyte in size.

27. The method of claim 21, wherein the compressing the digital model generates a file that is between one and five megabytes in size.

28. The method of claim 21, wherein the compressing the digital model generates a file that is between five and ten megabytes in size.

29. The method of claim 21, wherein the compressing the digital model generates a file that is between ten and fifty megabytes in size.

30. The method of claim 21, wherein the compressing the digital model generates a file that is between five kilobytes and fifty megabytes in size.

31. The method of claim 21, wherein the compressing the digital model generates a file that is between five kilobytes and one megabyte in size.

32. The method of claim 21, wherein the compressing the digital model generates a file that is less than one megabyte in size.

33. The method of claim 21, wherein the compressing the digital model generates a file that is less than two megabytes in size.

34. The method of claim 21, wherein the compressing the digital model generates a file that is less than three megabytes in size.

35. The method of claim 21, wherein the compressing the digital model generates a file that is less than four megabytes in size.

36. The method of claim 21, wherein the compressing the digital model generates a file that is less than five megabytes in size.

37. The method of claim 21, wherein the communicating the digital model further comprises generating an image of the digital model.

38. The method of claim 21, wherein the model comprises at least five teeth.

39. The method of claim 21, wherein the model comprises at least ten teeth.

40. The method of claim 21, wherein the model comprises a jaw.

41. The method of claim 21, wherein the model comprises gingiva.